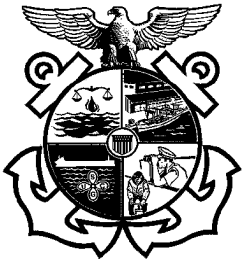
*United States Coast Guard*



# *FOREIGN CHEMICAL, GAS, & NATURAL GAS TANK VESSEL EXAMINATION BOOK*

| | | |
|---|---|---|
| **Name of Vessel** | **Flag**<br>No Change | |
| **IMO Number** | **Case Number** | |
| **Date Completed** | **Priority** | **Points** |
| **Location** | | |
| **Vessel Built in Compliance with SOLAS: 60 74 74/78 NA** | | |
| **Letter of Compliance**<br>Issued Endorsed | | |
| **Exam Type**<br>Biannual Reexamination | | |
| **Senior Marine Inspectors / Port State Control Officers**<br>**1.** _____ **3.** _____<br>**2.** _____ **4.** _____ | | |

CG-840 LOC
Rev. 1/99

## Total Time Spent Per Activity:

| Regular Personnel (Active Duty) | | | |
|---|---|---|---|
| ACTIVITY TYPE | ACTIVITY | TRAINING | (PERS) MI |
| | | | |
| | | | |
| | | | |
| | | | |

| TOTAL ADMIN HOURS | TOTAL TRAVEL HOURS |
|---|---|
| | |

| Reserve Personnel | | | |
|---|---|---|---|
| ACTIVITY TYPE | ACTIVITY | TRAINING | (PERS) MI |
| | | | |
| | | | |
| | | | |
| | | | |

| TOTAL ADMIN HOURS | TOTAL TRAVEL HOURS |
|---|---|
| | |

| Auxiliary Resources | |
|---|---|
| TOTAL BOAT HOURS | TOTAL AIRCRAFT HOURS |
| | |

## Use of Foreign Chemical, Gas, & Natural Gas Tank Vessel Examination Book:

This examination book is intended to be used as a job aid by Coast Guard senior marine inspectors/port state control officers during boardings of foreign-flagged tank vessels receiving Letters of Compliance (LOC's). This book contains an extensive list of possible examination items. It is not, however, the Coast Guard's intention to "inspect" all items listed. As a port state responsibility, senior marine inspectors/port state control officers must verify that the vessels and their crews are in substantial compliance with international conventions and applicable US laws. The depth and scope of the examination must be determined by the senior marine inspectors/port state control officers based on their observations.

This document does not establish or change Federal laws or regulations. References given are only general guides. Refer to IMO publications, CFR's, the Port State Control Job Aid, NVIC's or any locally produced cite guides for specific regulatory references. Although not all items in this book are applicable to all vessels, Section 1 should be filled out in its entirety at each examination and reexamination.

***NOTE:*** *Guidance on how to examine foreign tank vessels can be found in MSM Volume II, Chapter 21: Procedures Applicable to Foreign Tank Vessels.*

## Guide to Examinations:

☐ Biannual examination and reexamination

◇ Biannual examination only

○ Expanded examination as required

These three stages are only a general guide. Each senior marine inspector/port state control officer should determine the depth of the examination necessary. A checked box should be a running record of what has been examined by the senior marine inspector/port state control officer. It does not imply that the entire system has been examined or that all or any items are in full compliance.

***NOTE:*** *A reexamination normally includes an examination of the vessel's documents, certificates, and licenses, in addition to a "walk-through" of the vessel.*

## Pre-inspection Items

- Review MSIS records.
  - PSVH
  - VFIP
- Obtain copies of forms to be issued.

## Post-inspection Items

- Issue letters/certificates to vessel.
  - Record of deficiencies
- Complete MSIS entries within 48 hours.
  - PSAR
  - MSDS
  - PSDR
  - VFLD
  - VFIP

## Table of Contents:



(continued next page)

**Section 7: Expanded Examination Items**



**Section 8: Appendices**

## Section 1: Administrative Items

**IMO Applicability Dates:**

| Reference | Date |
|---|---|
| SOLAS 1960 | 26 MAY 65 |
| SOLAS 1974 | 25 MAY 80 |
| 1978 Protocol to SOLAS 1974 | 01 MAY 81 |
| 1981 Amendments (II-1 & II-2) | 01 SEP 84 |
| 1983 Amendments (III) | 01 JUL 86 |
| *Various additional amendments to SOLAS* | |
| MARPOL 73/78 Annex I | 02 OCT 83 |
| MARPOL 73/78 Annex II | 06 APR 87 |
| MARPOL 73/78 Annex III | 01 JUL 92 |
| MARPOL 73/78 Annex V | 31 DEC 88 |
| IBC Code | After 01 JUL 86 |
| BCH Code | Prior to 01 JUL 86 |
| IGC Code | After 01 JUL 86 |
| IGC Code (for existing vessels) | Prior to 01 JUL 86 |
| COLREGS 1972 | 15 JUL 77 |
| *Various additional amendments to COLREGS* | |
| Load Line 1966 | 21 JUL 68 |
| STCW 1978 | 28 APR 84 |
| 1991 Amendments | 01 DEC 92 |
| 1994 Amendments | 01 JAN 96 |
| 1995 Amendments | 01 FEB 97 |

## Involved Parties & General Information:

| |
|---|
| Owner's Agent |
| Individual |
| Phone Number |

| |
|---|
| Charterer's Agent |
| Individual |
| Phone Number<br>Same as Owner's Agent |

| |
|---|
| Owner—Listed on DOC or COFR |
| |
| |
| |
| No Change |

| |
|---|
| Operator |
| |
| |
| |
| No Change |

## Vessel Information:

| | | |
|---|---|---|
| Classification Society | | |
| ISM Issuer: Same as above?<br>Yes No If not the same, which Recognized Organization? _____<br>***NOTE:*** *The period of validity for ISM documents should correspond to the following list. If they do NOT, ISM documents should be further investigated.*<br>☐ *5 years = Full term (SMS and DOC)* ☐ *12 months = Interim (DOC)*<br>☐ *6 months = Interim (SMC)* ☐ *5 months = Short term (SMC)* | | |
| Last Drydocking Date | Next Drydocking Date | |
| Location of Last Drydocking | | |
| Date of Last Class Survey | | |
| Outstanding conditions of class or non-conformities | | |
| Last Port of Call | Next Port of Call | |
| Cargo | Current Operations | |
| Is pumproom gas-free? | Yes No | N/A |
| Call Sign | | No Change (VFID) |
| Gross Tons | | No Change (VFMD) |
| Built Date (use delivery date) | | No Change (VFCD) |
| Overall Length (in feet) | | No Change (VFMD) |

## Vessel Description:

| | |
|---|---|
| Bulk Liquid Carrier | Compress Gas Hazardous Material Carrier |
| Liquefied Gas Carrier | Other |
| LNG Carrier | _____ |

## Section 2: Certificates and Documents

**International Certificates:**

| Name of Certificate | Issuing Agency | ID # | Port Issued/ Country | Issue Date | Exp. Date | Endors. Date |
|---|---|---|---|---|---|---|
| **Certificate of Registry**<br>No Change | | | | | | |
| **Classification Document**<br>No Change | | | | | | |
| **Certificate of Financial Responsibility (COFR)**<br>No Change | USCG | | | | | |
| **Safety Construction (SLC)**<br>No Change | | | | | | |
| **Safety Equipment (SLE)**<br>No Change | | | | | | |
| **Safety Radio (SLT)**<br>No Change | | | | | | |
| **Cargo Ship Safety (CSS)**<br>No Change | | | | | | |

| Name of Certificates | Issuing Agency | ID # | Port Issued/ Country | Issue Date | Exp. Date | Endors. Date |
|---|---|---|---|---|---|---|
| **International Load Line (ILL)**<br>No Change | | | | | | |
| **International Oil Pollution Prevention w/Form B (IOPP)**<br>No Change | | | | | | |
| **IOPP for NLS Cargoes**<br>No Change | | | | | | |
| **Certificate of Fitness (COF)**<br>No Change | | | | | | |
| **International Tonnage (ITC)**<br>No Change | | | | | | |
| **Safety Management (SMC)**<br>No Change | | | | | | |
| **Document of Compliance (DOC)**<br>No Change | | | | | | |
| **Subchapter O Endorsement (SOE)**<br>No Change | USCG | | | | | |

## Manning Certification:

☐ Safe Manning Document — SOLAS 74/78 V/13, IMO Res.A.481(XII)

- Manning in accordance with document
  ***NOTE:*** *If vessel does not have a Safe Manning Document or is not manned in accordance with Safe Manning Document, local Consulate must be contacted and the deficiency resolved prior to vessel's departure from port.*
- Review copy of crew list

☐ Officers' certificates — STCW 95 I/2, STCW 95 I/10, STCW 95 VI/1, STCW 95 VI/2

- Master and chief engineer licenses current
- Navigating and engineering officers' licenses current; ***NOTE:*** *3000 kW = 4023 hp*
- Flag endorsement
- Medical certificates

☐ Crew documents — STCW 95 VI/1

- Documents current
- Medical certificates valid (issued by flag state)
- Minimum age 15 — ILO 147 Art. II

☐ Rest periods — STCW 95 VIII/1

- Review watch schedules

## Logs and Manuals:

☐ Lifesaving equipment maintenance record — SOLAS 74/78 III/19

- Periodic checks as required
- Visual inspection of survival craft / rescue boat and launching appliances
- Operation of lifeboat / rescue boat engines
- Lifesaving appliances, including lifeboat equipment examined

☐ Emergency training and drills — SOLAS 74/78 III/18

- Onboard training in use of lifesaving equipment (all crew members)
- SOLAS training manual
- Logbook records — SOLAS 74/78 III/18.5
- Weekly and lifeboat drills — SOLAS 74/78 III/25

Notes: _____

☐ Bridge log — 33 CFR 164.25; STCW 95 I/14

- Pre-arrival tests conducted
- Casualties (navigation equipment and steering gear failures reported) — 33 CFR 164.53
- Steering gear drills
- Emergency steering drills

☐ Exemptions to SOLAS certificates — SOLAS 74/78 I/4

## Pollution Prevention Records:

☐ Current pollution prevention records

- Person-in-charge — 33 CFR 155.700
- Transfer equipment tests and inspections — 33 CFR 156.170
- Declaration of Inspection — 33 CFR 156.150

◇ Oil record book (spot-check) — MARPOL Ax. I/20; 33 CFR 151.25

- Each operation signed by person-in-charge
- Each complete page signed by master
- Book maintained for 3 years

◇ Shipboard oil pollution emergency plan — MARPOL Ax. I/26.1; 33 CFR 151.26

- Approved by flag state / class society
- Contact numbers correct
- Immediate Actions List

◇ Vessel response plan (vessels carrying oil as secondary cargo) — 33 CFR 155.1045; 33 CFR 155.1030

◇ Transfer procedures — 33 CFR 155.720

- Posted / available in crew's language
- List of products carried by vessel
- Description of transfer system including a line diagram of piping
- Number of persons required on duty
- Duties by title of each person
- Means of communication
- Procedures to top off tanks
- Procedures to report oil discharges
- VCS information — 46 CFR 155.750
- Amendments authorized
- Transfer flag and light

Notes: _____

## Chemical Cargo Records:

| | | |
|---|---|---|
| ☐ | Documents | 46 CFR 153.901 |
| | • Readily available<br>• Free of alterations | |
| ☐ | Approved Procedures & Arrangement Manual | MARPOL Ax. II |
| ☐ | Cargo record book | MARPOL Ax. II/19 |
| | • Proper format<br>• Properly completed | |
| ☐ | Cargo information | 46 CFR 153.907 |
| | • Cargo manifest<br>• Procedures for spills / leaks | |
| ☐ | Cargo location plan | 46 CFR 153.907 |
| | • Cargo compatibility | 46 CFR Part 150 |
| ☐ | Cargo piping plan | 46 CFR 153.910 |
| ☐ | Shipping document | 46 CFR 153.907 |
| ☐ | Waiver letters carried | 46 CFR 153.10 |
| ☐ | Certificate of inhibition or stabilization | 46 CFR 153.912 |
| | • Name and concentration _____<br>• Date added to cargo _____<br>• Length of time effective _____<br>• Temperature limitations _____<br>• Certificate states action to be taken if voyage exceeds useful life of the inhibitor / stabilizer | |
| ☐ | Current copy of 46 CFR Parts 35, 150, and 153 aboard | 46 CFR 153.905 |

Notes: _____

## Section 3: General Examination Items

### Navigation Safety:

- ☐ Charts and publications for US waters/ intended voyage — 33 CFR 164.33
  - Current and corrected charts
  - US Coast Pilot
  - Sailing directions
  - Coast Guard Light List
  - Tide tables
  - Tidal current tables
  - International Rules of the Road
  - Inland Rules of the Road
  - International Code of Signals
  - Plotting equipment — 33 CFR 164.35
- ☐ Radar(s) and ARPA — 33 CFR 164.35, 33 CFR 164.37, 33 CFR 164.38
  - 2 required if over 10,000 GT
  - Operate independently
  - ARPA acquires targets
- ☐ Compasses — 33 CFR 164.35
  - Illuminated gyrocompass with repeater at stand
  - Illuminated magnetic compass
  - Current deviation table
- ☐ Test electronic depth sounding device and recorder — 33 CFR 164.35
  - Accurate readout
  - Test all transducers
  - Continuous recorder (chart)
- ☐ Electronic position fixing device — 33 CFR 164.41
  - Location accurate

Notes: _____

| | | |
|---|---|---|
| ☐ | Indicators | 33 CFR 164.35 |
| | • Illuminated rudder angle indicator | |
| | • Centerline RPM indicator | |
| | • Propeller pitch (CPP systems) | |
| | • Speed and distance indicators | 33 CFR 164.40 |
| | • Lateral thrusters | |
| ☐ | Communications | SOLAS 74/78 IV/6.3<br>33 CFR 26.03 |
| | • VHF radio | |
| ☐ | Steering gear instructions | 33 CFR 164.35 |
| | • Instructions | |
| | • Emergency instructions | |
| | • Block diagram | |
| ☐ | Maneuvering facts sheet with warning statement | 33 CFR 164.35 |
| ☐ | Radiotelephone (VHF-FM) | SOLAS 74/78 IV/7<br>33 CFR 26.03<br>33 CFR 26.04 |
| ☐ | EPIRB (406 MHz) | SOLAS 74/78 IV/7.1.6 |
| | • Float-free amount | |
| | • Battery date current | |
| | • Hydrostatic release | |
| ☐ | GMDSS | SOLAS 74/78 IV/8<br>SOLAS 74/78 IV/9<br>SOLAS 74/78 IV/10<br>SOLAS 74/78 IV/11 |
| | • Additional radio equipment for area of operation | |
| ◇ | Operationally test bridge steering | SOLAS 74/78 II/1-29 |
| | • Test power/control pumps independently | |
| | • Test follow-up and non-follow-up controls | |
| | • Rudder angle indicator accurate | |
| | • Activate loss of power alarm | |

Notes: _____

_____

_____

_____

_____

_____

◇ GMDSS lifeboat radios (VHF) — SOLAS 74/78 III/6.2

- 3 if over 500 GT
- Operable condition

◇ 9 GHz radar transponder (SART) — SOLAS 74/78 III/6.2 NVIC 9-93

- Vessels > 300 GT and < 500 require 1
- Vessels > 500 GT require 2
- Stowed so to be rapidly placed in survival craft, or stowed in survival craft

◇ Emergency source of power (radio) — SOLAS 74/78 IV/13

- Independent of ship's power system
- 1 or 6 hour time duration
- Battery system
- Battery charger

◇ NAVTEX — SOLAS 74/78 IV/7.1.4

◇ Radio installation — SOLAS 74/78 IV/6.2

- Safe installation
- Independent lighting
- Marked with call sign

Notes: _____

## General Health and Safety

☐ Accident Prevention and Occupational Health — COMDTINST 16711.12A, ILO 147

- Rails, guards, protective clothing and equipment, warning signs posted in crew work areas

☐ Crew accommodations — COMDTINST 16711.12A, ILO 147

- Habitable conditions
- Adequate lighting and ventilation
- Free of cargo and stores
- Individual berths

☐ Hospital space — COMDTINST 16711.12A, ILO 147

- Designated for ships ≥ 500 GT with 15 or more crew on voyage of more than 3 days
- Not used for stowage or berthing
- Properly operating toilet
- $O_2$ resuscitation equipment — IBC/BCH Codes
- MFAG onboard (IMO Publication) — IBC/BCH Codes

☐ Galley — COMDTINST 16711.12A, ILO 147

- Sanitary conditions
- Hot and cold-running water
- Adequately equipped to prepare food
- Mess hall provided for crew

☐ Refrigerator and stores spaces — COMDTINST 16711.12A, ILO 147

- Storage free of insects

☐ Sanitation — COMDTINST 16711.12A, ILO 147

- Toilets operate (1/8 crew)
- Showers operate (1/8 crew)
- Wash basins
- Lighted / heated / ventilated
- Reasonably clean

Notes: _____

☐ General safety — COMDTINST 16711.12A, ILO 147

- Safe access to all spaces
- Spaces adequately lighted
- No electrical hazards
- Warning notices posted as necessary

☐ Muster lists and emergency instructions

- Available for each person — SOLAS 74/78 III/8
- Posted in conspicuous places
- Language understood by crew
- Shows crew member duties — SOLAS 74/78 III/53

☐ Safe access to tanker bows — SOLAS 74/78 II-1/3-3
(vessels built prior to 1 JUL 98 not required to comply until 1 JUL 2001)

## Structural Integrity

***NOTE:*** *Request records of Outstanding Conditions of Class. (Form or format may vary depending on classification society.) Conditions of Class may identify structural defects, wastage, etc. Conditions may also identify ships overdue for drydocking, repair or other required service.*

☐ Hull structure — ICLL 66 Reg. 1

- Frame pulling away
- Fractures in corners
- Holes in main decks
- Leaks / patching on ballast tanks
- Bulkheads / decks warped
- Excessive wastage

Notes: _____

☐ Side shell, accessible structural members, decks, and superstructure — ICLL 66 Reg. 1

- Fractures, corrosion, wastage, pitting or damage to the extent that it may impair ship's seaworthiness
- Excessive doublers, postage stamp inserts, cement boxes or soft patches
- Welding burn marks or other evidence of recent repair work
- Load line marked in accordance with certificates — ICLL 66 Regs. 4 - 9
  - Hailing port
  - Name
- Railings

☐ Watertight/weathertight openings

- Watertight doors, gaskets, dogs — ICLL 66 Reg. 12
- Other openings (means of securing) — ICLL 66 Regs. 13 - 18
- Vents, air pipes and closing appliances — ICLL 66 Regs. 19 & 20

## Ground Tackle:

☐ Emergency towing arrangements — SOLAS 74/78 II-1/3-4
(vessels ≥ 20,000 DWT only)

- Approved by Administration

◇ Anchor and windlass (spot-check)

- Foundations
- Drive units
- Guards
- Covers for moving parts
- Brake pads
- Deck fittings
- Electrical (wiring) or hydraulic piping

◇ Mooring winches / capstans

- Foundations
- Cables / hooks
- Boom
- Brake
- Electrical (wiring) or hydraulic piping
- Ladders / rails

Notes: _____

## Lifesaving Equipment:

☐ Lifeboats / rescue boats

SOLAS 74/78 III/26
SOLAS 74/78 III/19.2

- Required number
- Hull integrity and fittings
- Engine starts

| Stbd Lifeboat | Port Lifeboat | Lifeboats |
|---|---|---|
| Engine equipped | Engine equipped | Wooden |
| Engine tested | Engine tested | Fiberglass |
| Lifeboat lowered | Lifeboat lowered | Steel |
| | | Covered |
| Free fall lifeboat with rescue boat | | |

☐ Davit system

SOLAS 74/78 III/19.2
SOLAS 74/78 III/48

- Structure and foundation
- Roller tracks
- Lubrication (evidence of use)
- Falls; end for end / renew (2.5 / 5 years)
- No obstructions to lowering

☐ Embarkation area

SOLAS 74/78 III/11.7

- No obstructions
- Embarkation ladder
- Launching instructions
- Emergency lighting

SOLAS 74/78 III/9

Notes: _____

| | |
|---|---|
| ☐ Liferafts | SOLAS 74/78 III/19 |
| • Required number | SOLAS 74/78 III/26 |
| • Stowage | SOLAS 74/78 III/29 |
| • Float-free arrangement<br>– Hydrostatic release / weak link | SOLAS 74/78 III/19.8.1 |
| • Annual servicing (hydrostatic release and inflatable liferaft)<br>– 17 months, if Administration-approved | SOLAS 74/78 III/19.9.1 |
| • Launching instructions posted | SOLAS 74/78 III/9 |
| • Bow / stern station<br>– Lashed down on deck or in marked location<br>– Lifejackets available | |
| ☐ Lifebuoys (spot-check) | |
| • Condition | SOLAS 74/78 III/19.2 |
| • Bridge location<br>– Quick release system<br>– Smoke and light float | SOLAS 74/78 III/7.1 |
| • Deck location<br>– 50% with waterlights | |
| • Retro-reflective tape | SOLAS 74/78 III/30.2.7 |
| ☐ Lifejackets—watchstanders and crew (spot-check) | |
| • Condition | SOLAS 74/78 III/19.2 |
| • Stowage | SOLAS 74/78 III/7.2.2 |
| • Retro-reflective material | SOLAS 74/78 III/30.2.7 |
| • Lights | SOLAS 74/78 III/27.2 |
| • Whistles | SOLAS 74/78 III/32.1.6 |
| ☐ Line-throwing appliances (spot-check) | SOLAS 74/78 III/17 |
| • 4 charges | |
| ☐ Pyrotechnics (spot-check) | SOLAS 74/78 III/6.3 |
| • 12 distress flares | |
| ☐ Immersion suits and thermal protective aids (spot-check) | SOLAS 74/78 III/27.3 |
| • Condition | SOLAS 74/78 III/19.2 |
| • Retro-reflective material | SOLAS 74/78 III/30.2.7 |

Notes: _____

## Fire Protection:

☐ Fire control plan — SOLAS 74/78 II-2/20

- Permanently exhibited
- Language of flag state
- Copy permanently stored in weathertight container outside deckhouse

☐ Fire doors (spot-check) — SOLAS 74/78 II-2/46, SOLAS 74/78 II-2/47

- Machinery space and stair towers
- Not tied or blocked open
- Installed closure devices working

☐ Fire detection systems (spot-check)

- Smoke / fire alarms — SOLAS 74/78 II-2/13
- Remote pull stations — SOLAS 74/78 II-2/11.8
- Smoke / flame / heat detectors and sensors — SOLAS 74/78 II-2/53

☐ International shore connection — SOLAS 74/78 II-2/19

☐ Means of escape from accommodation, machinery, and other spaces — SOLAS 74/78 II-2/45

- Two required (some exceptions)
- Dead end corridors

☐ Portable fire extinguishers (spot-check)

- Good condition / available for immediate use — SOLAS 74/78 II-2/21
- Located on stations
- Serviced at periodic intervals — SOLAS 74/78 II-2/6.5

◇ Test operation of fire main system

- Required number of fire pumps — SOLAS 74/78 II-2/3
- Location of pumps — SOLAS 74/78 II-2/4
- Pumps, hydrants, piping, hoses, and nozzles in good condition and available for immediate use — SOLAS 74/78 II-2/21

Notes: _____

◇ Structural fire protection (spot-check) — SOLAS 74/78 II-2/42

- Bulkheads
- Insulation
- Ventilation
- Penetrations

◇ Fixed fire extinguishing systems: cargo, machinery, and other spaces — SOLAS 74/78 II-2/21; 46 CFR 34.05-5(a)(2)

- Tanks, cylinders, piping, controls, alarms, and release mechanisms in good condition and available for immediate use

| **Type of system:** (circle appropriate type) | | | |
|---|---|---|---|
| Low Pressure $CO_2$ | High Pressure $CO_2$ | Halon | Foam |

## **Pollution Prevention:** (spot-check at reexaminations)

☐ Pollution placard posted — 33 CFR 155.450

☐ MARPOL V placard posted — MARPOL Ax. V/9

☐ Oil and hazmat

- Fuel oil and bulk lubricating oil discharge containment — 33 CFR 155.320
- Prohibited oil spaces — 33 CFR 155.470

☐ Oily-water separating equipment, bilge alarm, and bilge monitor — MARPOL Ax. I/16; 33 CFR 155.380

- Alarm, recorder
- Standard Discharge Connection — 33 CFR 155.430

☐ Garbage

- Shipboard garbage properly disposed — MARPOL Ax. V/3; 33 CFR 151.63
- Incinerator
  - Evidence of use (clinkers)
  - Safety of burner assembly
  - Electrical controls
- Garbage Management Plan — MARPOL Ax. V/9

Notes: _____

☐ Marine sanitation device

- Type (I, II, or III) — 33 CFR 159.7
- Nameplate — 33 CFR 159.55
- Placard — 33 CFR 159.59

## Machinery Spaces:

☐ Main and auxiliary machinery installations

- General housekeeping — SOLAS 74/78 I/11(a)
- Fire hazards
- Shock and electrical hazards — SOLAS 74/78 II-1/45.1
- Personnel hazards (moving parts not protected, hot surfaces, etc.) — SOLAS 74/78 II-1/26
  - Leaking fuel oil piping or fittings
  - Sea chests, sea valves / spool pieces in good condition
- Tank tops and bilges free of oil — SOLAS 74/78 II-2/15
- Watertight doors — SOLAS 74/78 II-1/23
  - Hand / power operation
  - Local / remote control
  - Alarm

☐ Steering gear machinery — SOLAS 74/78 II-1/29

- Linkages
- Hydraulic leaks
- Ram guides
- Lubrication

◇ Operationally test main and auxiliary steering gear — SOLAS 74/78 II-1/29.15 through 29.20

- 28-second operation
- Systems operate independently
- Unusual vibrations / leaks
- Ram hunting
- Limit switches
- Communications with bridge
- Steering gear instructions (block diagram)

Notes: _____

◇ Main ship service generators — SOLAS 74/78 II-1/41

***NOTE:*** *Two independent sources of power require.*

- F/O piping
- Cooling lines
- Controls

◇ Emergency generator room — SOLAS 74/78 II-1/43

- Test operation of prime mover
- Personnel safety
- Ventilation adequate
- Electrical switchboard
  - Grounds

◇ Bilge pumps — SOLAS 74/78 II-1/21

- Two required

Notes: _____

## Section 4: Cargo Operations for Chemical / Gas Carriers

## Bulk Liquid, Liquefied Gas, or Compressed Gas Hazardous Materials:

***NOTE:*** *If vessel carries cargo listed in 46 CFR Part 154, use the requirements under "Bulk Liquefied Gases" at the end of this section.*

☐ Containment

| | |
|---|---|
| • Type | |
| I | 46 CFR 153.230 |
| II | 46 CFR 153.231 |
| III | 46 CFR 153.232 |
| • Separation of cargo tanks / other spaces | 46 CFR 153.233 |
| • Piping location restriction exemptions | 46 CFR 153.235 |
| • Materials | |
| – Prohibited | 46 CFR 153.236 |
| – Required | 46 CFR 153.238 |
| – Cast iron | 46 CFR 153.239 |

☐ Tanks

| | |
|---|---|
| • Double bottom or deep tanks | 46 CFR 153.250 |
| • Independent tanks | 46 CFR 153.251 |
| • Access | 46 CFR 153.252 |
| • Trunks, domes, and openings | 46 CFR 153.254 |
| • Linings | 46 CFR 153.256<br>46 CFR 153.266 |

☐ Piping

| | |
|---|---|
| • Design | 46 CFR 153.280 |
| • Independent tanks | 46 CFR 153.281 |
| • Filling lines | 46 CFR 153.282 |
| • Separation | 46 CFR 153.292 |
| • Marking | 46 CFR 153.294 |

Notes: _____

_____

_____

_____

_____

_____

☐ Valves and handling equipment

- Manual stop — 46 CFR 153.283
- Pump manifolds — 46 CFR 153.285
- Emergency shutdown stations tested — 46 CFR 153.296
  - Minimum of two
  - Location
  - Single actuator
  - Properly marked
- Actuator at cargo control — 46 CFR 153.297

☐ Cargo handling space ventilation

- Forced exhaust ventilation — 46 CFR 153.310
- System standards — 46 CFR 153.312
  - Discharge 10 meters from accommodation / service spaces
  - Operable from outside space
  - Air exchange rate 30 times per hour
  - Exhaust above and below deck places
- Special ventilation rate — 46 CFR 153.316
  - Rate for certain cargoes (45 times per hour and no less than 4 meters above deck)

☐ Pumprooms — MSM Vol. I Ch.10 Appendix A; MSM Vol. II Ch. 5.I

***NOTE:*** *If pumproom is not gas-free, issue requirement to make it available at next U.S. port.*

- Marine Chemist Certificate — 46 CFR 153.330
  - Chemist No. _____
  - Certificate No._____
  - Date issued _____
- Ventilation — SOLAS 74/78 II-2/59.3
- Hoisting arrangement — 46 CFR 153.332
- Pump discharge pressure gauge — 46 CFR 153.333
- Bilge pumping system — 46 CFR 153.334
  - Witness operation and alarm
- Fire extinguishing system — SOLAS 74/78 II-2/63
- Electrical installation
- Special requirements — 46 CFR 153.336

Notes: _____

☐ Tank venting

- Safety relief valves only
- Type
  - B/3 vents — 46 CFR 153.350
  - 4m vent — 46 CFR 153.351
  - High-velocity vents — 46 CFR 153.353
- B/3 and 4m outlets — 46 CFR 153.352
  - Vertical discharge
  - Prevent precipitation from entering
- No restrictions — 46 CFR 153.360
- System drains — 46 CFR 153.362
- Pressure vacuum valves — 46 CFR 153.355
  - Location
  - Requirements — 46 CFR 153.368
  - Set pressures > .5 psi
  - Date last tested _____
- Liquid overpressurization — 46 CFR 153.365
  - Control system meets 46 CFR 154.408
    - Yes
    - No
  - Spill valve meets ASTM F-1271
    - Yes
    - No
- Special requirements — 46 CFR 153.372

☐ External examination of inert gas system — 46 CFR 32.53; MSM Vol. II Ch. 15

- Piping and components
- Scrubber
- Fans
- Valves
- Expansion joints
- Free of corrosion or leakage

Notes: _____

☐ Gauging system

- Type — 46 CFR 153.400

  Open

  Closed — 46 CFR 153.404
  - Vapor return connection
  - High level alarm
  - Means for sampling

  Restricted — 46 CFR 153.406
  - Vapor-tight cover
  - Lock open P/V valves or valved bypasses
  - Sounding tube requirements — 46 CFR 153.407

☐ Tank overflow control — 46 CFR 153.408

- High level alarm — 46 CFR 153.409
  - Set point (< 97%) _____%
  - Witnessed operation test
  - Visual / audible alarms at cargo control and open deck
  - Marked “High Level Alarm”

  Cargo overflow alarm — 46 CFR 153.408
  - Independent of high level alarm
  - Operates on loss of power
  - Set point (< 100%)
  - Witnessed test at tank
  - Visual / audible alarms in containment area and cargo loading control
  - Marked “Tank Overflow Alarm”

  Automatic shutdown system — 46 CFR 153.408
  - Independent of high level alarm
  - Operates on loss of power
  - Set point (< 100%) _____%
  - Witnessed test at tank

Notes: _____

☐ Temperature control systems — 46 CFR 153.430

- Standby cooling system — 46 CFR 153.432
- Refrigerated cargo tanks
  - Alarms — 46 CFR 153.438
    - Pressure
    - Temperature
  - Witness operation
- Fluid compatibility with cargo — 46 CFR 153.436
- Remote temperature sensors — 46 CFR 153.440

☐ Flammable or combustible cargoes

- Weatherdeck fire protection system — 46 CFR 153.460
- Electrical bonding of independent tanks — 46 CFR 153.461
- Vent discharge 10 meters from ignition source — 46 CFR 153.463
- Vapor detector — 46 CFR 153.465
  - 1 fixed
  - 1 portable
  - Witnessed calibration

☐ Emergency equipment

- Personnel emergency and safety equipment — 46 CFR 153.214
  - Two stretchers or wire baskets
  - Self-contained breathing apparatus (SCBA) with 5 refill tanks; date professionally serviced _____ — BCH/3.16.8 & IBC/14.2.6
  - Overalls
  - Boots
  - Long-sleeve gloves
  - Goggles
  - Steel-cored lifeline with harness
  - Explosion-proof lamp
  - First aid equipment
  - Inspected every 30 days — BCH/3.16.8 & IBC/14.2.6
- Safety equipment lockers — 46 CFR 153.215
  - Minimum of two
  - Accessible
  - Markings
- Shower and eyewash fountains — 46 CFR 153.216

Notes: _____

☐ Toxic vapor detectors — 46 CFR 153.526

- Vapor detector
  - 1 fixed
  - 1 portable
  - Witness calibration

☐ General safety

- Entry into spaces — 46 CFR 153.934
- Opening of tanks — 46 CFR 153.935
- Storage of cargo samples — 46 CFR 153.935(a)

☐ Vapor Control System (VCS) — 46 CFR 156.120(aa) 46 CFR 39.10-13(d)

Vessel in not using a VCS

Vessel is using a VCS

- LOC endorsed for VCS use
- Complies with 33 CFR 156.120(aa) and 156.170(g)

☐ Cargo transfer procedures

- Signals — 46 CFR 153.953
  - Red flag
  - Red light
- Warning signs — 46 CFR 153.955
  - Minimum of two
  - Legends
    - "Warning"
    - "Dangerous Cargo"
    - "No Visitors"
    - "No Smoking"
    - "No Open Lights"
  - Lettering — 46 CFR 153.957
- Person-in-charge
  - Valid document — 33 CFR 155.700
  - Designated by master — 33 CFR 155.710
  - Speaks English or has interpreter — 46 CFR 153.959
- Approval to begin transfer — 46 CFR 153.972
- Cargo hose
  - Marked in accordance with 46 CFR 153.940
  - Working pressure
  - Date of last pressure test _____< 1 year
  - Temperature range _____

Notes: _____

## Bulk Liquefied Gases:

***NOTE:*** *Vessels carrying bulk liquefied gases must meet the requirements of 46 CFR Part 154.*

☐ Cargo piping — 46 CFR 154.310

- Connections

☐ Pump and compressor rooms — 46 CFR 154.315

- If prime mover is in adjacent space
  - Bulkhead / deck is gas tight
  - Positive pressure seal(s)

☐ Control stations — 46 CFR 154.320

- Above weather deck
- Gas-safe
- Instrumentation

☐ Openings — 46 CFR 154.330

- Distance from athwartships bulkhead > 10 feet
- Fixed port lights
- Gaskets on wheelhouse doors and windows
- Air intakes

☐ Air locks — 46 CFR 154.345

- Two steel, self-closing doors, with no hold-open devices
- Audible / and visual alarms
- Mechanically ventilated from a gas-safe place
- Air pressure in air lock is > gas-dangerous space, but < gas-safe space
- Vapor leak monitor
- Automatic power cut-off in gas-safe space
- Witnessed operational tests

☐ Liquid pressure relief — 46 CFR 154.517

- Date last tested and certified _____
- Piping relief valves discharge — 46 CFR 154.519
  - Cargo tank
  - Vent mast
  - Suction (if on cargo pump)

Notes: _____

☐ Maximum allowable relief valve setting for cargo tanks ≤ 10 psig (69 kPa)

- Liquid and vapor connections — 46 CFR 154.530
- Shutoff valves located as close to tank as possible
  - Capable of local manual operation
  - At least one remotely controlled quick-closing shutoff valve
- Quick-closing valve emergency shutdown — 46 CFR 154.540
  - Closes all valves
  - Two remote locations
  - Fusible elements
  - Automatic shutdown of cargo pumps and compressors — 46 CFR 154.534
- Quick-closing valve requirements — 46 CFR 154.544
  - Fail close
  - Local manual closing
  - Witness test (< 30 seconds)
  - Time to close _____

☐ Maximum allowable relief valve setting for cargo tanks > 10 psig (69 kPa)

Shutoff valves located as close to tank as possible — 46 CFR 154.532

- Capable of local manual operation
- At least one remotely controlled quick-closing shutoff valve
- Witness test (< 30 seconds)
- Time to close _____

If piping is less than 2 inches (50 mm) — 46 CFR 154.532(b)

- Excess flow valve
- Closes automatically — 46 CFR 154.546

OR

One valve that is capable of local manual operations and meets 46 CFR 154.540 and 154.544

☐ Cargo hose — 46 CFR 154.556

- Marking
- Hydrostatic test date _____ — 46 CFR 154.562

Notes: _____

☐ Cargo vent systems

- Pressure relief systems — 46 CFR 154.801
  - Tank volume ≤ 20 cubic meters and has at least one pressure relief valve
  - Tank volume > 20 cubic meters and had at least two pressure relief valves of same capacity
  - Tank MARVS _____
  - Relief valve setting(s) less than tank MARVS
  - Date last tested _____
  - Properly sealed
  - No stop valves unless interlocked
- Vacuum protection (method for testing either of the following) — 46 CFR 154.804
  - 2 independent pressure switches
    - 1 to operate audible and visual alarms set at 80% in cargo control room and in wheelhouse
    - 1 to automatically shut off liquid or vapor suction
  - Vacuum relief valve
    - Adequate gas flow capacity
    - Set to open
    - Admits inert gas, vapor, or air
- Vent masts — 46 CFR 154.805
  - Discharge vertically upward
  - Proper weather hood
  - Proper screen (last serviced / replaced____)
  - Height above weather deck_____ (> B/3 or 6 meters / 19.7 feet)
  - Height above working level _____ (6 meters /19.7 feet)
    - Adequate distance from air takes to accommodation and other gas-free spaces > 10 meters

Notes: _____

☐ Atmospheric control (hold and interbarrier spaces) — 46 CFR 154.902

Vessel carries flammable cargoes with full secondary barriers

- Inert gas system
  - At least one check valve in cargo area to prevent backflow
  - Inert gas has < 5% oxygen
  - Audible and visual alarm set at 5%
  - Inerted spaces fitted with proper relief devices
- Stored gas
  - Must meet 46 CFR 154.1848

Vessel carries flammable cargoes with partial secondary barriers

- Meets requirements of full secondary barriers with the capacity to inert largest hold and interbarrier space, AND either
  - Meets 46 CFR 154.1848 OR
  - Has air drying system — 46 CFR 154.902(c)(2)

Vessel carries nonflammable cargoes with secondary barriers

- Meets requirements of full secondary barriers OR
- Has air drying system — 46 CFR 154.902(c)(2)

☐ Electrical (gas-dangerous space or zone) — 46 CFR 154.1010

- Intrinsically safe
- Only specific explosion-proof equipment in cargo handling rooms, cargo hose storage rooms, spaces with cargo piping, and gas-dangerous zones on the weather deck
- Only through runs of cable in cargo hose storage rooms, spaces with cargo piping, and gas-dangerous zones on the weather deck

Notes: _____

☐ Firefighting

- Exterior water spray — 46 CFR 154.1105
  - Areas protected — 46 CFR 154.1110
  - Discharge — 46 CFR 154.1115
  - Nozzles — 46 CFR 154.1120
  - Pipes, fittings, and valves — 46 CFR 154.1125
  - Pumps — 46 CFR 154.1135
    - Witnessed simultaneous operation of deck spray and firemain systems
- Dry chemical — 46 CFR 154.1145

  Cargo capacity < 1,000 cubic meters (35,300 cubic feet)—at least 1 self-contained unit

  Cargo capacity ≥ 1,000 cubic meters (35,300 cubic feet)—at least 2 self-contained units
  - Date last serviced _____
- Distribution — 46 CFR 154.1150
  - Cargo areas and pipelines
    - At least 2 hand hose lines OR
    - At least 1 hand hose line and 1 monitor
  - After end of cargo areas
    - At least 1 storage unit AND
    - Hand hose line or monitor
  - Each cargo manifold
    - At least 1 monitor
- Controls — 46 CFR 154.1165
  - Local for hand hose line and monitor
  - Remote for cargo manifold monitor

☐ Cargo area mechanical ventilation — 46 CFR 154.1200

- Fixed exhaust systems where required
  - Exhaust system ducts where required — 46 CFR 154.1205
  - Location of exhaust ducts
- Fixed supply systems where required
- Operational controls outside the ventilated space
- Electric ventilation motor location
- Ventilation impeller and housing materials
- Protective metal screen

Notes: _____

☐ Liquid level gauging

Open — 46 CFR 154.1305

Restricted

Closed
- Date last calibrated and tested _____
- Maximum operating pressure _____

- Closed gauge shutoff valve — 46 CFR 154.1310
- Restricted gauge excess flow valve — 46 CFR 154.1315
- High liquid level alarm system — 46 CFR 154.1325
  - Independent of gauging system
  - Set below 100% liquid full
  - Activates audible and visual alarms upon activation of quick-closing valves
  - Witness operational tests

☐ P/V protection — 46 CFR 154.1335

- At least 1 high pressure sensor
  - Actuates below tank MARVS
  - Actuates audible and visual alarms at cargo control station and remote group alarm in wheelhouse
  - Witness operational test
- At least 1 low pressure sensor
  - Actuates audible and visual alarms at cargo control station and remote group alarm in wheelhouse
  - Witness operational test
- Manifold pressure gauge fitted where required

☐ Temperature measuring devices — 46 CFR 154.1340

- Bottom and maximum liquid level locations
- Cargo control station readouts
  - Audible and visual alarms in cargo control room and wheelhouse
  - Witness operational test

Notes: _____

☐ Gas detection systems

- Gas detection for “I” OR “I” and “T” cargoes
  - Fixed flammable gas detection system — 46 CFR 154.1345, 46 CFR 154.1350
    - Sampling points where required
    - Measures gas concentrations at least 0% to 200% of alarm concentrations
    - Date last calibrated _____
    - Span gas used _____
    - Concentration _____
    - Audible and visual alarms that are actuated— — 46 CFR 154.1365
      - At 30% or less LEL
      - For power failure
      - For loss of gas sampling flow
    - Sampling points monitored every 30 minutes or less
    - Operable flow meter
    - Witness operation and operational tests
  - 2 portable detectors that each measure 0% to 100% LEL
- Gas detection for “T” OR “I” and “T” cargoes
  - 2 portable detectors that each show TLV
  - Fixed sampling tubes in each hold and interbarrier space — 46 CFR 154.1360
- Oxygen analyzer

Notes: _____

☐ Safety equipment — 46 CFR 154.1400

- Required safety equipment based on cargo capacity (see the following table)
  - Vessel's cargo capacity is < 25,000 cubic meters — 46 CFR 154.1400(a)
  - Vessel's cargo capacity is ≥ 25,000 cubic meters — 46 CFR 154.1400(b)
- Respiratory equipment — 46 CFR 154.1405
  - Additional required equipment on board
- Decontamination shower — 46 CFR 154.1410
  - Shower and eye wash on weatherdeck
  - Properly marked
- Equipment locker — 46 CFR 154.1430
  - Required equipment stowed

| Equipment | Amount Required for Specific Cargo Capacities | | |
|---|---|---|---|
| | < 25,000 cubic meters | ≥ 25,000 cubic meters | Table 4 (special requirements) |
| 30-minute SCBA | 6 | 8 | 3 |
| SCBA spare bottles | 9 | 9 | 9 |
| Steel-cored lifeline | 6 | 8 | 3 |
| Explosion-proof flashlight | 6 | 8 | 3 |
| Fire axes | 3 | 3 | 0 |
| Helmets | 6 | 8 | 3 |
| Boots and gloves | 6 | 8 | 3 |
| Goggles | 6 | 8 | 3 |
| Heat-resistant outfits | 3 | 5 | 0 |
| Chemical-protective outfits | 3 | 3 | 3 |

Notes: _____

## Section 5: Cargo Operations for Natural Gas (LNG) Carriers

### Vapor Control Systems:

| | | |
|---|---|---|
| ☐ | Person-in-charge of transfer system completed training program | 46 CFR 39.10-11 |
| ☐ | VCS certification | 46 CFR 39.10-13 |
| | • Marine Safety Center Letter No._____ OR | |
| | • Approval from recognized class society addressing the following items: | |
| | – Vessel name | |
| | – Class of vessel or official number | |
| | – Call sign | |
| | – Flag | |
| | – Reviewed by proper authority to meet U.S. standard | 46 CFR Part 39 |
| | – Inert gas manual amended | 46 CFR 32.53-85(b) |
| | – Proper allowable transfer rate (cubic meters / hour) | |
| | – Applicable cargo tanks | |
| | – Maximum density of cargo vapor | |
| | – List of cargoes (proper cargo names) | |
| | – Oil transfer procedures amended | 33 CFR 155.750(d) |

### VCS Design and Equipment:

***NOTE:*** *Requirements for VCS design and equipment are detailed in 46 CFR 39.20-1.*

☐ Piping permanently installed

- Interim for chemical tankers

☐ Connection located at manifold

- N/A if chemical tankship venting system is not common

☐ Incompatible cargo vapors can be isolated

☐ Connections located at cargo tanks

Notes: _____

- ☐ Drains fitted in low points of system
- ☐ Piping electronically bonded to hull and electrically continuous
- ☐ VCS able to be isolated from IGS with isolation valve
- ☐ Cargo tank venting able to be isolated from VCS
- ☐ Manual isolation valve at each vessel vapor connection
  - Position of isolation valve verified by:
    - Markings
      OR
    - Position of stem
- ☐ Last meter of piping before connection
  - Painted red / yellow / red
  - Labeled “vapor”
- ☐ Vapor connections
  - Stud 0.5 X 1.0 inches at 12 o’clock position on the flange in line with bolt pattern
- ☐ Vapor hoses
  - Annually hydrostatically tested to 1.5 X MAWP (also vapor collection arm)
  - Design burst pressure of 25 psig
  - MAWP of 5 psig
  - Capable of withstanding 2 psig vacuum without collapsing or constriction
  - Electrically continuous with a maximum resistance of 10,000 ohms
  - Resistant to abrasion and kinking
  - Last meter of painted red / yellow / red and labeled “vapor”
- ☐ Saddles available for support of VCS hoses

Notes: _____

## Cargo Gauging System:

☐ Closed gauging system — 46 CFR 39.20-3

- Independent of overfill alarm system
- Full range of measurement in each cargo tank
- Liquid level indicated where cargo transfer is controlled — 46 CFR 151.15-10
- Unit installed on cargo tanks during entire transfer if closed gauging system is portable

## Liquid Overfill Protection:

***NOTE:*** *Requirements for liquid overfill protection are detailed in 46 CFR 39.20-7.*

☐ Overfill system

- Provides an alarm upon loss of power or electrical circuitry failure
  - Audible and visual alarm on deck and where cargo transfer is controlled
  - Capable of being tested at the tank or have a electronic self-testing feature
- Properly marked on deck
- Operationally tested and demonstrated

☐ High-level alarm

- Independent of overfill system
- Provides an alarm upon loss of power or electrical circuitry failure
  - Audible and visual alarm on deck and where cargo transfer is controlled
  - Capable of being tested at the tank or have a electronic self-testing feature
- Alarm sounds not higher than overfill alarm and at no lower than 95% of tank capacity
- Operationally tested and demonstrated

☐ Spill valves — 46 CFR 39.20-9(c)

☐ Rupture disks — 46 CFR 39.20-9(d)

Notes: _____

## Vapor Overpressure and Vacuum Protection:

***NOTE:*** *Requirements for vapor overpressure and vacuum protection are detailed in 46 CFR 39.20-11.*

- ☐ VCS system designed to discharge cargo vapor at 1.25 times the maximum transfer rate
- ☐ Design pressure verified
  - Spill valves, rupture disks, working vapor pressure set below maximum design pressure of VCS
- ☐ Maximum design vacuum pressure verified
- ☐ P/V valves settings verified
  - Pressure and vacuum annually pressure tested
  - Do not relieve at a pressure < 1.0 psig
  - Do not relieve at a vacuum < -0.5 psig
  - All P/V valves meet regulations or API 2000 standard — 46 CFR 162.017
  - A means to check the seating of the P/V valve if installed after 23 JUL 91

## High and Low Vapor Pressure Protection:

***NOTE:*** *Requirements for high and low vapor protection are detailed in 46 CFR 39.20-13.*

- ☐ Pressure sensing devices located in main vapor collection line
  - Tested to show accurate within 10% of the actual pressure
- ☐ Pressure indicator located at the cargo control station
- ☐ High pressure alarm
  - Audible and visual alarms where cargo transfer is controlled
  - Activates no higher than 90% of the highest P/V valve vacuum setting

Notes: _____

☐ Low pressure alarm

- Audible and visual alarms where cargo transfer is controlled
- Activates no less than 0.144 for an inerted tankship or no less than the lowest P/V valve vacuum setting

## Operations:

***NOTE:*** *Requirements for operations are detailed in 46 CFR 39.30-1.*

☐ Pressure drops

Determined through VCS from most remote cargo tank to the connection

Determined for all cargoes at maximum transfer rates and at lessor transfer rates

Determined through vapor hoses, if carried

☐ Cargo tanks properly filled

- Less than 98.5% of tank capacity
  OR
- Less than overfill setting

☐ High-level and overfill alarms been tested within 24 hours prior to loading cargo

☐ Operationally test and demonstrate remote operated valves

☐ Operationally test and demonstrate emergency shutdowns

Notes: _____

☐ Oil transfer procedures properly amended 33 CFR 155.750(a)

- Line diagram of VCS piping
  - Valves
  - Control devices
  - P/V valves
  - Pressure indicators
  - Flame arrestors (if fitted)
  - Detonation arrestors (if fitted)
  - Spill valves (if fitted)
  - Rupture disks (if fitted)
- Maximum allowable transfer rate _____
- Initial transfer rates for each tank_____
- Tables or graphs and VCS pressure drops
- Relief settings
  - Spill valves _____
  - Rupture disks _____
  - P/V valves _____
- Description of and procedures for operating VCS
  - Pre-transfer equipment inspection requirements
  - Vapor line connection
  - Closed gauging system
  - High-level alarm system
  - Independent automatic shutdown system (if fitted)

## Cargo Boil-off Used As Fuel:

☐ General 46 CFR 154.705

- Inert gas connection
- Fuel flow maintained when gas supply is cut off 46 CFR 154.1854

Notes: _____

☐ Fuel lines — 46 CFR 154.706

- Master valve

  Double-walled fuel line
  - Annular space inerted
  - Pressure in annular space greater than gas pressure
  - Visual and audible alarms in machinery space to indicate loss of inert gas pressure
  - Termination — 46 CFR 154.707(a)

  Single-walled fuel line
  - Installed in mechanically exhaust-ventilated duct or pipe
  - Ventilation (30 changes of air / hour) — 46 CFR 154.1205
  - Pressure in space between inner and outer pipe < atmospheric pressure
  - Continuous gas detection
  - Termination hood or casing — 46 CFR 154.707(a)

☐ Valves — 46 CFR 154.708

- 2 fail-closed valves
- 1 fail-open valve for venting
- Automatic operation for—
  - Loss of boiler forced draft
  - Flame failure
  - Abnormal fuel supply pressure
- Master gas fuel valve outside machinery space
  - Operable from machinery space and at valve
  - Automatic closure for—
    - Gas leak
    - Loss of ventilation
    - Loss of inert gas pressure

☐ Gas detection equipment — 46 CFR 154.709, 46 CFR 154.1350

- Audible and visual alarm in machinery control station and wheelhouse
- Closes master gas fuel valve

Notes: _____

## Section 6: Drills

### ◇ Fire Drill:

| | | |
|---|---|---|
| Initial notifications | Familiarity with duties | Space isolation |
| General alarms / signals | Familiarity with equipment | Smoke control |
| Crew response | Fire pumps started | Communications w/ bridge |
| Properly dressed / equipped | Two jets of water | |
| Language understood by crew | Fire doors and dampers | |

(SOLAS 74/78 III/18.3; MSM Vol. II/22.C.7.i; NVIC 6-91)

Location: _____ Time on Scene: _____

Notes: _____

## ◇ Abandon Ship Drill:

| | | |
|---|---|---|
| General alarms / signals | Familiarity with duties | Boat operation |
| Muster lists | Provide equipment | Egress procedures |
| Muster of crew | Familiarity with equipment | Davit-launched liferaft drill |
| Crew response | Lower lifeboat | Communication w/ bridge |
| Language understood by crew | Brake operation | Lighting |
| Lifejackets | Engine start | |

(SOLAS 74/78 III/18.3; MSM Vol. II/22.C.7.h)

Location: _____ Time to Water: _____

Notes: _____

## Section 7: Expanded Examination Items

## Manuals and Instructions:

- ○ Check for presence (in appropriate language) of the following documents
  - Instructions for maintenance and operation of all installations / equipment for fighting and containing a fire — SOLAS 74/78 II-2/20
  - Training manual for lifesaving appliances — SOLAS 74/78 III/18.2
  - Instructions for onboard maintenance of lifesaving appliances — SOLAS 74/78 III/51
  - Stability booklet, associated stability plans and information — SOLAS 74/78 III/19.3, SOLAS 74/78 III/52, SOLAS 74/78 II-1/22, ICLL 66 Reg. 10
- ○ Cargo gear certificate
- ○ Human Factors — STCW Code
  - Determine if the appropriate crew members are able to understand the information given in manuals, instructions, etc., relevant to the safe condition of the ship and its equipment, and that they are aware of the requirements for maintenance, periodical testing, training, drills, and recording of logbook entries.

## Safety Management System (SMS):

***NOTE:*** *Requirements and guidance for inspecting vessel Safety Management Systems are detailed in SOLAS 74/78, Chapter IX and NVIC 4-98.*

- ○ Documentation (may be in the form of a Safety Management Manual)
  - Controlled documents
  - Safety and Environmental policy
  - Master of vessel familiar with SMS
  - Language understood by crew
  - Documentation identifies:
    - Written procedures kept on board vessel
    - Essential or critical equipment identified (or a separate manual containing this information)
    - Procedures for reporting non-conformities
    - Company's designated person(s) (name or title, and address)

Notes: _____

○ Company's training program conducted in accordance with STCW — STCW I/14

***NOTE:*** *Documented procedures established to ensure new personnel and personnel transferred to new assignments are given proper familiarization with their duties.*

- Proper documentation
- Training conducted before crew is assigned shipboard duties
- Essential instructions are documented and provided before sailing

○ Crew familiar with SMS issues

- Ship's officers
  - Documented procedures
  - Preventative procedures for essential equipment
  - Reporting requirements for non-conformities and able to identify typical scenarios that may result in a documented non-conformity
- Master and chief engineer familiar with internal audit procedures (e.g., know how many audits required per year and have participated in at least one) in addition to requirement's for ship's officers

○ Documented maintenance system

- Documented in writing and computerized versions
- Readily available and in language understood by those who use them
- Procedures are followed
- Records maintained

○ Vessel-specific procedures are documented in writing and address the following areas:

***NOTE:*** *Not mandatory that they follow the exact format listed below.*

- Preventative maintenance
- Navigation
- Bunkering operations
- Emergency preparedness
- Pollution prevention
- Technical procedures
- Communications

Notes: _____

- ○ Audits
  - Internal audits conducted as specified by SMS
    ***NOTE:*** *Do NOT examine internal audit records.*
  - External audit results reviewed
    - Status of open non-conformities relevant to deficiencies leading to detention
    - Status of implementation of corrective and preventative measure
- ○ SMS review conducted by Master in accordance with procedures in SMS
  - Non-conformities identified
  - Report of non-conformity prepared and sent in accordance with procedures established by SMS

## Navigation Safety:

- ○ Test navigation equipment listed in Section 3 to the extent necessary to determine if equipment is operating properly.
- ○ Human Factors (spot-check): determine if deck officers are familiar with the following items:

  STCW Table A-II
  NVIC 3-98

  - Operation of bridge control and navigational equipment
  - Use of nautical publications and charts
  - Ship maneuvering characteristics
  - Lifesaving signals
  - Bridge procedures, instructions, manuals, etc.
  - Changing steering from automatic to manual and vice versa
  - Preparations for arrival and departure
  - Communications with engineroom
  - Use of VHF
  - Raising the alarm
  - Abandon ship drill and fire drill

Notes: _____

- ○ Lights, shapes, and sound signals — 72 COLREGS
  - Navigation lights
  - Sound signals
  - Distress signals
- ○ Radio log — SOLAS 74/78 IV/17
- ○ Radio operation — SOLAS 74/78 IV/7
  - Transmit on 2182 MHz and Ch. 6, 13, 16, 70
- ○ INMARSAT communications — SOLAS 74/78 IV/7.1.5

## Cargo Operations:

- ○ Human Factors: determine if personnel are familiar with the following items: — STCW Table A-II/III
  - Special requirements (e.g., loading, segregation, firefighting equipment, etc.) for particular cargoes
  - Dangers posed by the cargo
  - Measures to be taken for cargo emergencies

## Lifesaving Equipment:

- ○ Lifeboats/liferafts/rescue boats
  - Ensure effective operation of winches, davits, falls, sheaves, etc. (Lower at least one lifeboat to the water.) — SOLAS 74/78 III/19
  - Test lifeboat and rescue boat flemming gear and/or engines
  - Verify presence/condition of lifeboat equipment — SOLAS 74/78 III/41
  - Retro-reflective tape
  - Lighting — SOLAS 74/78 III/11.4

Notes: _____

- ○ Emergency communication equipment
  - 2-way VHF radiotelephone apparatus — SOLAS 74/78 III/6.2
  - Radar transponders
  - Survival craft EPIRBs
  - Onboard communication and alarm system — SOLAS 74/78 III/6.4
- ○ Line-throwing appliance — SOLAS 74/78 III/17.49
  - Specifications and equipment
- ○ Pilot ladders and hoists in good condition — SOLAS 74/78 V/17
- ○ Distress signals — SOLAS 74/78 III/6.3
  - 12 red rocket parachute flares

## Fire Protection:

- ○ Structural fire protection — SOLAS 74/78 II-2/42, 43, 44, 46, 47, 49, & 50
  - Bulkheads and decks meet applicable fire integrity requirements
  - Openings (e.g., doors, ductwork, electrical wires, piping, etc.) constructed so that they do not destroy fire resistance of bulkheads
  - Manual and automatic fire doors examined / tested
- ○ Fire detection, fire alarm, and automatic sprinkler systems fitted where required and operating properly — SOLAS 74/78 II-2/52
- ○ Ventilation systems — SOLAS 74/78 II-2/48
  - Main inlets and outlets of all ventilation spaces can be closed from outside ventilated space
  - Power ventilation capable of being shutdown from outside ventilated space
- ○ Fire pumps — SOLAS 74/78 II-2/4
  - Fire main activated; water pressure satisfactory (energize forward-most and highest hydrants)

Notes: _____

- ○ Paint lockers and flammable liquid lockers protected by an appropriate fire extinguishing arrangement — SOLAS 74/78 II-2/18.7
- ○ Fixed fire extinguishing arrangements in cargo spaces for vessels ≥ 2000 GT — SOLAS 74/78 II-2/53.1
- ○ Special arrangements in machinery spaces — SOLAS 74/78 II-2/11
  - Machinery space ventilating fans can be shut down from outside spaces
  - All openings capable of being closed from outside machinery spaces
  - Machinery driving forced / induced draft fans, oil fuel transfer pumps, and other fuel pumps fitted with remote shutdowns located outside space concerned
- ○ Firemen's outfits (spot-check) — SOLAS 74/78 II-2/17.3
  - Two lockers
  - Four outfits
  - Protective clothing
  - Helmet, boots, and gloves
  - Lamp
  - Axe
  - Breathing apparatus and lifeline

## Pollution Prevention:

- ○ Equipment
  - Test automatic stopping device required for discharge — MARPOL Ax. I/10
  - Segregation of oil fuel and water ballast systems — MARPOL Ax. I/14
  - Oily residue tank (discharge arrangements, homogenizers, incinerators, etc.) — MARPOL Ax. I/17
  - Witness operational test of emergency shutdown — 33 CFR 155.780

Notes: _____

- ○ Human Factors — STCW Table A-III
  - Oil and oily mixtures — MARPOL Ax. I
    - Responsible officer familiar with handling of sludge and bilge water
    - Quantity of residues generated
    - Capacity of holding tanks
    - Capacity of oil water separator
    - Note any inadequacies in reception facilities used; advise master to report these to flag state
  - Garbage — MARPOL Ax. V
    - Note any inadequacies in reception facilities used; advise master to report these to flag state
    - Crew familiar with Annex V requirements

## Machinery Spaces:

- ○ Test communication between navigating bridge and machinery space — SOLAS 74/78 II-1/37
  - Two means, one of which must be an engine order telegraph
- ○ Emergency source of electrical power — SOLAS 74/78 II-1/43, SOLAS 74/78 II-1/44
  - Location
  - Generator and/or batteries tested under load
  - Emergency lighting
- ○ Main engine / vital auxiliaries (spot-check) — SOLAS 74/78 II-1/27
  - F/O pumps / piping
  - S/W pumps / piping
  - J/W pumps / piping
  - L/O pumps / piping
  - Piston cooling pumps / piping
  - Air compressors / receivers
  - Fuel / oil purifiers
  - H/O heaters / transfer pump

Notes: _____

- ○ Steering gear alarms — SOLAS 74/78 II-1/29
  - Low hydraulic oil
  - Loss of power
  - Loss of phrase
  - Overload
- ○ Human Factors: determine if personnel are familiar with the operation of the following items — STCW Table A-III
  - Emergency generator:
    - Actions necessary before engine can be started
    - Different methods by which generator may be started
  - Stand-by generator engine:
    - Methods to start engine automatically or manually
    - Blackout procedures
    - Load-sharing system
  - Steering gear:
    - Action needed to bring main and auxiliary into operation
    - Changing steering from automatic to manual and vice versa
  - Bilge pumps:
    - Starting procedures for main and emergency bilge pump
    - Appropriate valves to operate
  - Fire pumps:
    - Starting procedures for main and emergency fire pumps
    - Appropriate valves to operate

Notes: _____

## Inert Gas Systems (IGS):

***NOTE:*** *Requirements and guidance on inert gas systems is detailed in 46 CFR 32.53, SOLAS 74/78 II-2/62, and MSM Volume II, Chapter 15.*

○ Type of system installed

Flue gas

Gas generator

Nitrogen bottles

○ Sampling / testing of gas pad

| Tank Number | % Oxygen | OR | % Nitrogen |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| Vessel is gas-free or not carrying cargoes required to be inerted | | | |

○ Proper operation of IGS components

- Blowers
  - Free from excessive bearing noise and vibration
  - Remote shutdown for IGS blower
- Scrubber room ventilation
- Primary and alternate saltwater scrubber pumps
- Deck seal
  - Water level
  - Automatic filling
  - Open drain cocks on IG main
- Remote operated / automatic control valves
  - Open or closed indicator
- Gauges
  - Calibration of inline $O_2$ analyzing equipment
  - Check $O_2$ and pressure level recordings
- Portable instruments calibrated
- IG generator
  - Combustion control system and fuel supply
  - Interlocking of soot blowers (IGS automatically shuts down when soot blowers engaged)

Notes: _____

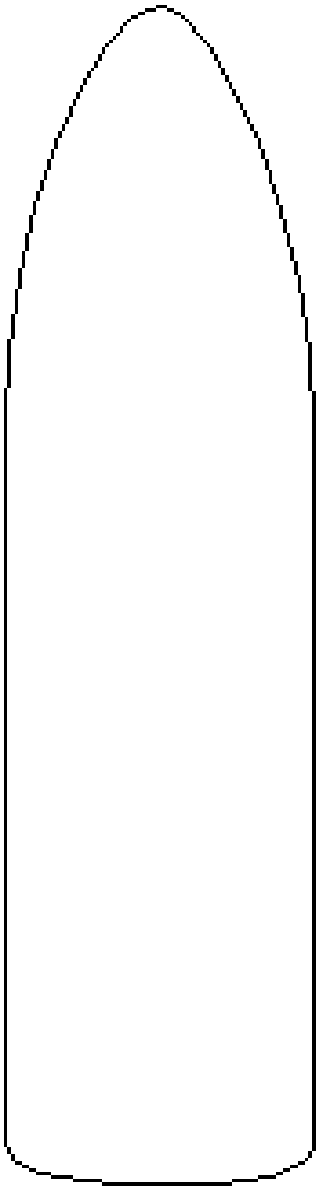
○ Proper operation of IGS audible and visual alarms

- High $O_2$ content of gas in IGS main
  - Activated at 8% concentration
- Low gas pressure in IGS main downstream of all non-return devices
  - Activated at 100mm (4 inches) water
- High gas pressure in IGS main downstream of all non-return devices
  - Blowers automatically shut down
  - Gas-regulating valves close
- Low / high water level or low flow to deck seal
  - Blowers automatically shut down
- Blowers discharge high temperature
  - Alarms activated at 150°F (65.6°C) or lower
  - Blowers automatically shut down
  - Gas-regulating valves close
- Failure of IGS blowers
  - Gas-regulating valves close
- Low water pressure or flow to flue gas scrubber
  - Blowers automatically shut down
  - Gas-regulating valves close
- High water level in flue gas scrubber
  - Blowers automatically shut down
  - Gas-regulating valves close
- Failure of power supply to automatic control system for gas-regulation valve and indicating devices for IG supply
- IG generator
  - Insufficient fuel supply
  - Failure of power supply to generator or control system for generator

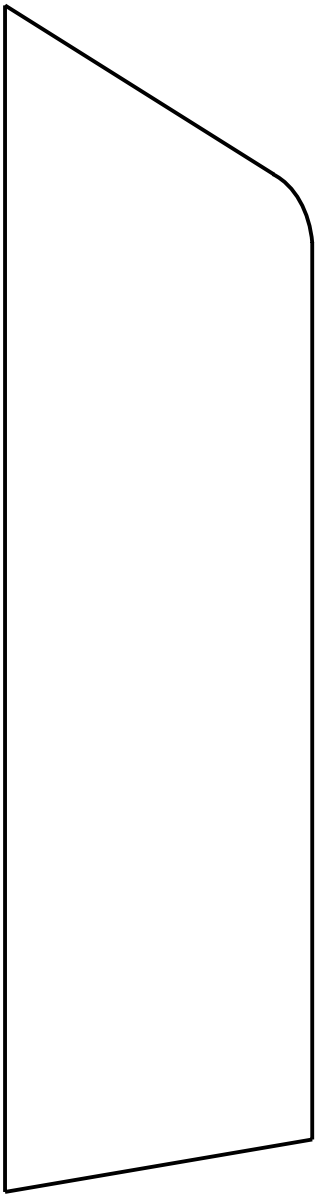
Notes: _____

## Section 8: Appendices

**Vessel Layout:**



- Double hull / bottom / sides
- Ballast tanks (SBT/CBT)
- Chemical type: I II III
- Tank arrangement
- Deckhouse location
- External / internal framing
- Layout of pumps – type



## Prohibited Chemical Cargoes:

The following cargoes have been determined to be too hazardous to be carried in U.S. waters:

1. Acrolein
2. Chlorine (on self-propelled vessels)
3. Ethylenimine
4. Hydrofluoric Acid
5. Hydrogen
6. Hydrogen Chloride
7. Hydrogen Fluoride
8. Methylcyclopentadienyl Manganese Tricarbonyl
9. Nitric Acid (in concentrations > 70%)
10. Nitrogen Tetroxide
11. Oxygen
12. Phosphorus Trichloride
13. (Beta) Propiolactone

## Recommended Port State Control Procedures:

The following flowcharts contain information gleaned from the Marine Safety Manual Volume II, Chapter 24. The senior marine inspector/port state control officer should be familiar with this chapter as well as the information pertaining to Port State Control examinations contained in MSM Volume II, Chapters 19—Foreign Vessel Exams (General), 21—Foreign Vessel Exams (Tanker), and 23—Targeting of Foreign Vessel Boardings.

Considering the seriousness of the deficiencies, the OCMI or COTP must determine the appropriate control action to impose on these vessels to ensure the safety of the vessel, the port, and the environment. The degree of control imposed, as well as the authority used to exercise control, must be consistent with the nature of the deficiencies.

The following definitions and terms of reference are used in the MSM to describe key elements of Port State Control enforcement:

**Clear Grounds.** Evidence that the vessel, its equipment, or crew do not correspond substantially to the requirements of the relevant conventions or that the master or crew members are not familiar with essential shipboard procedures relating to the safety of vessels or the prevention of pollution.

**Control**. Control is the process of imposing a port state's or flag state's authority over a vessel to ensure that its structure, equipment, operation and crew meet applicable standards. The process is affected by any verbal or written directives from the OCMI/COTPs or their representatives, which require action or compliance by the vessel.

**Detention**. Detention is a control action that restricts a vessel's right of free movement. The imposition of a restriction on the movement of a vessel constitutes a detention regardless of whether or not a delay from a vessel's normal or expected itinerary occurs. Detentions may be carried out under the authority of the applicable international convention, the Ports and Waterways Safety Act (PWSA) or a Customs hold.

**Intervention**. An intervention is a control action taken by a port state, which interposes the port state's authority over a foreign flag vessel in order to cause the vessel to be brought into compliance with an applicable international convention. Interventions are undertaken by a port state when a vessel's flag state has not, can not, or will not exercise its obligations under an international convention to which it is a party. This may include requesting appropriate information, requiring the immediate or future rectification of deficiencies, detaining the vessel, or allowing the vessel to proceed to another port for repairs.

**Nonconforming Vessel**. Any vessel failing to comply with one or more applicable requirements of U.S. law or international conventions is a nonconforming vessel. A nonconforming vessel is not necessarily a substandard vessel unless the discrepancies endanger the vessel, persons on board, or present an unreasonable risk to the marine environment.

**Substandard Vessel**. In general, a vessel is regarded as substandard if the hull, machinery, or equipment, such as lifesaving, firefighting and pollution prevention, are substantially below the standards required by U.S. laws or international conventions, owing to:

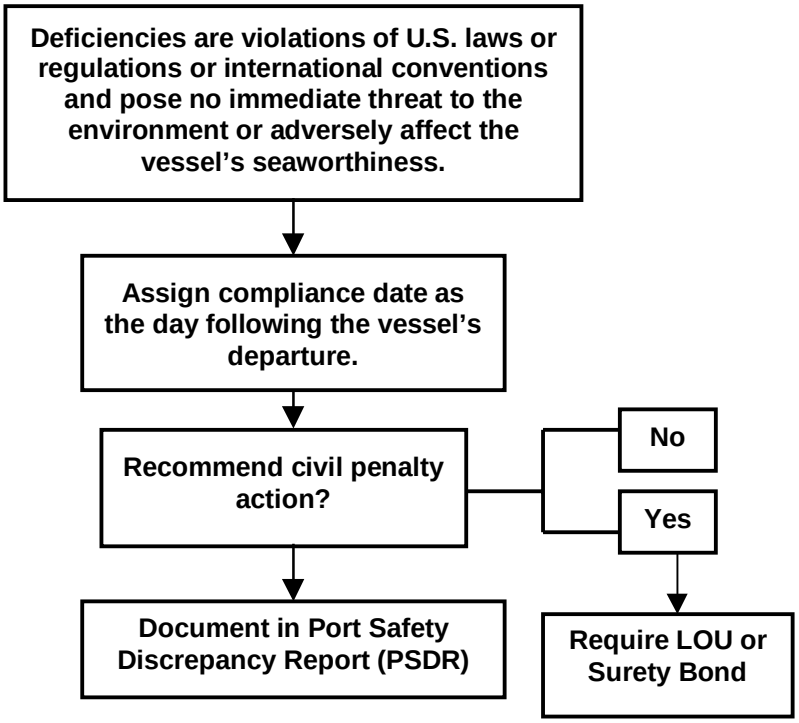
- The absence of required principal equipment or arrangement;
- Gross noncompliance of equipment or arrangement with required specifications;
- Substantial deterioration of the vessel structure or its essential equipment;
- Noncompliance with applicable operational and/or manning standards; or
- Clear lack of appropriate certification, or demonstrated lack of competence on the part of the crew.

If these evident factors as a whole or individually endanger the vessel, persons on board, or present an unreasonable risk to the marine environment, the vessel should be regarded as a substandard vessel.

**Valid Certificates**. A certificate that has been issued directly by a contracting government or party to a convention, or on the behalf of the government or party by a recognized organization, and contains accurate and effective dates, meets the provisions of the relevant convention, and corresponds to the particulars of the vessel and its equipment.

**Requiring Corrective Measures Prior to Return to U.S.**

## (NO DETENTION)

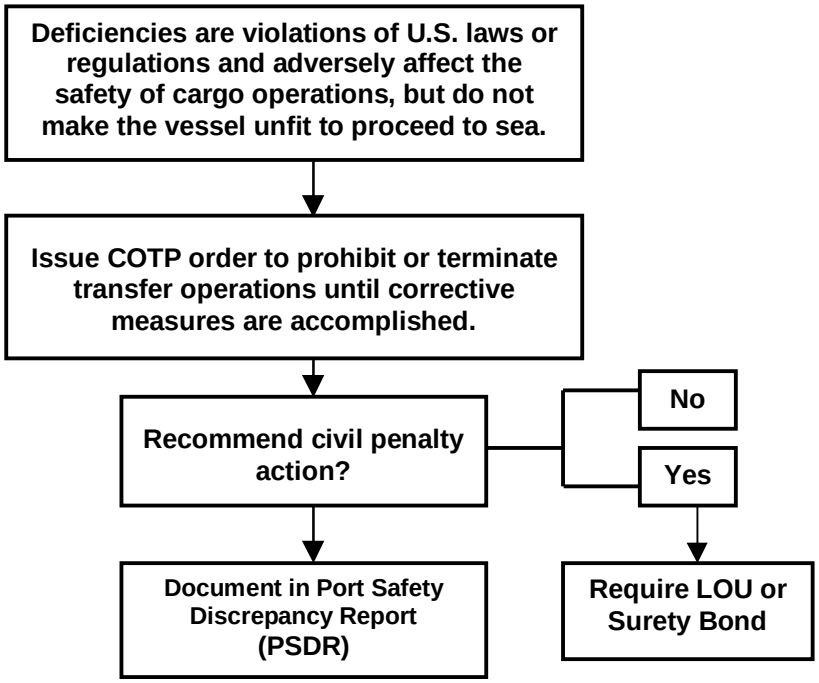



Examples include the following:

- Charts or nautical publications not currently corrected.
- Portable hoses have not been tested but appear in good condition.
- Actual location of safety equipment deviates from the vessel safety plan.
- Electrical fixtures in paint locker not appropriately certified for safe usage in hazardous location. (Operational controls, such as disconnecting the electrical power source or removing flammables from the space, may satisfactorily remove risk to vessel.)

**Requiring Corrective Measures Prior to Cargo, Bunkering or Lightering Operations**

**(NO DETENTION)**

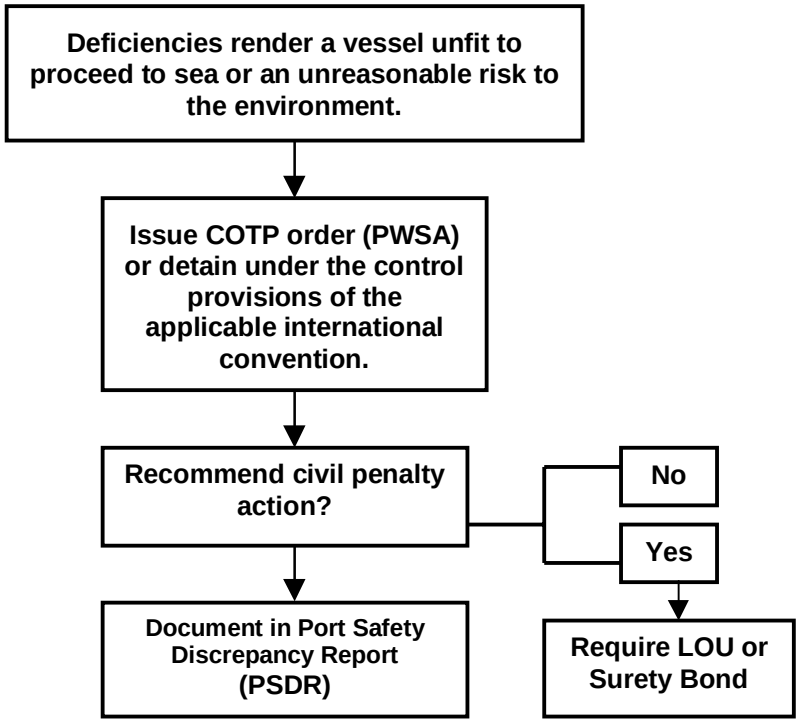



Examples include the following:

- Oil transfer procedures incomplete.
- Information on properties and hazards of cargoes not on board.
- High and low level alarms inoperative.

**Requiring Corrective Measures Prior to Departure**

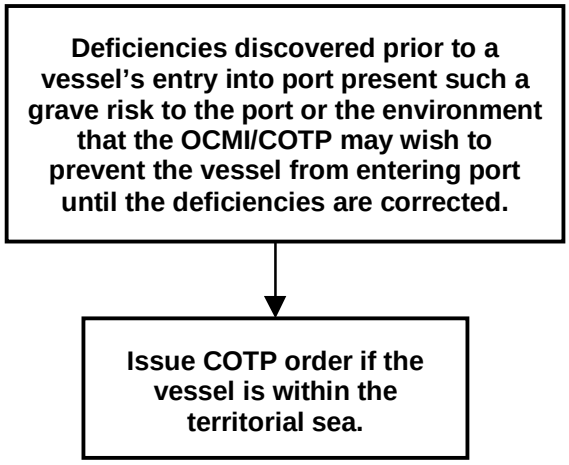
## (DETENTION)




Examples include the following:

- Excessive wastage, corrosion, pitting, holes, or damage to the hull, cargo hatches, fire main, or other vital system.
- Inoperable emergency fire pump or emergency generator.
- Inability to lower lifeboats.
- Inoperable lifeboat motors (i.e., will not start).
- Crew incompetent to carry out duties (e.g., fire or boat drills, cargo transfer, stability calculations, etc.).
- Licenses invalid.
- Safe Manning Document not on board.

**Requiring Corrective Measures Prior to Entry**




Examples include the following:

- Leaking tanks.
- Carrying dangerous cargoes with expired documents.
- Carrying incompatible cargoes.
- Invalid ISM certificates.
- COFR not on board.

## Detention Information:

***NOTE:*** *Complete prior to recommendation.*

Verify owner (from DOC or COFR), operator, and mailing address.

Verify owner's agent.

Verify last and future drydock dates and locations.

If dual classed, who will respond? _____

Which agency issued the documents that have major problems?

What is the date of the last survey conducted for those items that have problems?

What are the vessel's plans to deal with the problems?

What is the crew's attitude toward the problems?

Is the detention ISM related? If so, include ISM certification information in the Detention Report to G-MOC-4.

Notes: _____

Notes:

## Deficiency Summary Worksheet:

**Name of Vessel** _____ **VIN** _____

| Deficiency | MSIS Code | Req't. Issued / Date Completed |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Deficiencies identified should be listed with MSIS codes. At completion of inspection/examination, any outstanding deficiencies shall be entered in MIDR or PSDR as appropriate. All deficiencies found (outstanding and completed) shall be entered in the Deficiency Summary. Worklist items, which serve only as memory joggers to complete inspection/examination (e.g., test emergency fire pump), should not be coded as deficiencies.

## MSIS Codes for Deficiencies:

| | | | | | |
|---|---|---|---|---|---|
| **BS** | Ballast | **DC** | Dry Cargo | **IC** | I/C Engine |
| **BI** | Bilge | **ES** | Electrical | **LS** | Lifesaving |
| **BA** | Boiler, Aux. | **FF** | Firefighting | **MI** | Miscellaneous |
| **BM** | Boiler, Main | **FL** | Fuel | **NS** | Navigation |
| **CS** | Cargo | **GS** | General Safety | **PP** | Propulsion |
| **DM** | Deck Machinery | **HA** | Habitation | **SS** | Steering |
| **DL** | Doc., Lics., Pmts. | **HU** | Hull | | |

## Conversions:

| Distance and Energy | | | | |
|---|---|---|---|---|
| Kilowatts (kW) | X | 1.341 | = | Horsepower (hp) |
| Feet (ft) | X | 3.281 | = | Meters (m) |
| Long Ton (LT) | X | .98421 | = | Metric Ton (t) |

**Liquid** ***(NOTE:*** *Values are approximate.)*

| Liquid | bbl/LT | $m^3/t$ | $bbl/m^3$ | bbl/t |
|---|---|---|---|---|
| Freshwater | 6.40 | 1.00 | 6.29 | 6.29 |
| Saltwater | 6.24 | .975 | 6.13 | 5.98 |
| Heavy Oil | 6.77 | 1.06 | 6.66 | 7.06 |
| DFM | 6.60 | 1.19 | 7.48 | 8.91 |
| Lube Oil | 7.66 | 1.20 | 7.54 | 9.05 |

**Weight**

| | | | | | |
|---|---|---|---|---|---|
| 1 Long Ton | = | 2240 lbs | 1 Metric Ton | = | 2204 lbs |
| 1 Short Ton | = | 2000 lbs | 1 Cubic Foot | = | 7.48 gal |
| 1 Barrel (oil) | = | 5.61 ft = 42 gal = 6.29 $m^3$ | 1 psi | = | .06895 Bar = 2.3106 ft of water |

**Temperature**: Fahrenheit = Celsius (°F = 9/5 °C + 32 and °C = 5/9 (°F – 32))

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | = | -17.8 | 80 | = | 26.7 | 200 | = | 93.3 |
| 32 | = | 0 | 90 | = | 32.2 | 250 | = | 121.1 |
| 40 | = | 4.4 | 100 | = | 37.8 | 300 | = | 148.9 |
| 50 | = | 10.0 | 110 | = | 43.3 | 400 | = | 204.4 |
| 60 | = | 15.6 | 120 | = | 48.9 | 500 | = | 260 |
| 70 | = | 21.1 | 150 | = | 65.6 | 1000 | = | 537.8 |

**Pressure**: Bars = Pounds per square inch

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 Bar | = | 14.5 psi | 5 Bars | = | 72.5 psi | 9 Bars | = | 130.5 psi |
| 2 bars | = | 29.0 psi | 6 Bars | = | 87.0 psi | 10 Bars | = | 145.0 psi |
| 3 Bars | = | 43.5 psi | 7 Bars | = | 101.5 psi | | | |
| 4 Bars | = | 58.0 psi | 8 Bars | = | 116.0 psi | | | |